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A second species for the remarkable genus *Palaeobutheolus* Lourenço, 2025 from Burmese Cretaceous amber, and confirmation of its association to the extant family Buthidae (Scorpiones: Buthoidea)

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Keywords:

Scorpiones;
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new species;
description;
variability;
Cretaceous;
Burmite.

Abstract. – The study of a new scorpion specimen from Cretaceous Burmite leads to the description of a second new species belonging to the remarkable genus *Palaeobutheolus* Lourenço, 2025, and confirms at the same time its association to a buthoid lineage and to the extant family Buthidae C. L. Koch, 1837. The new species shows some clear distinct characters, particularly a telson with a pear-like-shape, without a subaculear tooth but with the presence of a pseudo annular ring, the anterior edge of the carapace almost convex, spiracles oval to slit-like, distinct morphometric values and marked differences in the number and position of trichobothria. The discovery of this new species comforts the validity of the genus *Palaeobutheolus* and the existence of buthid elements within the Burmite fauna.

Lourenço W. R. & Velten J., 2025. – A second species for the remarkable genus *Palaeobutheolus* Lourenço, 2025 from Burmese Cretaceous amber, and confirmation of its association to the extant family Buthidae (Scorpiones: Buthoidea). *Faunitaxys*, 13(58): 1 – 5.

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Introduction

Even if scorpions remain uncommon among the arthropods found in Burmite (Lourenço, 2023), more and more specimens became available in recent years. Moreover, the quality of several pieces had considerably improved allowing a better selection of what can be precisely described (Lourenço & Velten, 2025a,b,c). These new studies equally contribute to a more precise global view of this Cretaceous scorpion fauna (*e. g.* Lourenço, 2023; Lourenço & Velten, 2023a,b, 2024, 2025a,b,c).
Among the most common elements found in Burmite are those of the family Palaeoburmesebuthidae Lourenço, 2015 (Lourenço & Velten, 2025d), which were associated to buthoids following the study of the first well-preserved specimens which revealed common characters with this lineage (Lourenço, 2015, 2016; Lourenço & Beigel, 2015). Other groups were clearly associated to buthids such as the genera *Archaeoananteroides* Lourenço, 2016, but have subsequently been transferred to the revalidated family Ananteridae Pocock, 1900 (Lourenço & Velten, 2025b) and *Cretaceousbuthus* Lourenço, 2022 (Lourenço & Velten, 2022). More recently, a new genus *Palaeobutheolus* Lourenço, 2025 was equally associated to the extant buthids (Lourenço & Velten, 2025c). As already commented (Lourenço & Velten, 2025c), a polemic discussion concerning the existence of buthoid elements during the Cretaceous is often evocated, mainly based on theoretical speculation or 'recommendations' (Santiago-Blay *et al*., 2022) which sound more like a form of pontification. However, all the recent discoveries certainly bring a new support to confirm the presence of buthid elements during the Cretaceous.
In the present contribution, one quite well-preserved scorpion specimen was studied and confirmed to be a new species of the recently described genus *Palaeobutheolus* Lourenço, 2025. This new finding comforts the existence of buthid elements during the Cretaceous period and once again attests about the important degree of scorpion diversity in the Burmese amber-producing forests.

Material and methods

The specimen investigated is quite well preserved in a very clear piece of pale-yellow amber. The amber piece is more or less oval and measures 29x17x2 mm. The scorpion representing the new species is complete. Since the resin is rather pale and largely translucid many characters are clearly visible; only the observation of a few regions is disturbed by the presence of some inclusions; mainly vegetal debris. Some characters, such as the trichobothria of the external face of the patella are precisely observed for the first time for a buthoid element from Burmite. The schematic drawings provided are an interpretation of what was observable. Illustrations and

Reviewer: Eric Ythier (*BYG Taxa*, *France*) - ZooBank: https://zoobank.org/06FD0852-A88E-49E5-B8E6-E1494B86C4E1

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measurements were produced with the aid of a Wild M5 stereomicroscope, equipped with a drawing tube (camera lucida) and an ocular micrometre. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations are those of Vachon (1974, 1975). Other morphological terminologies mostly follow Hjelle (1990). Trichobothria are definitely recorded when their bothria (areoles) can be observed; nevertheless, some trichobothria can be deduced through the observation of thin hairs. Considering the morphologies of pedipalp and pectines, the scorpion is most certainly a male and probably represents a pre-adult or a juvenile.

Taxonomic treatment

Superfamily **Buthoidea** C. L. Koch, 1837

Family **Buthidae** C. L. Koch, 1837
(Assignment requiring further investigation)

Genus ***Palaeobutheolus*** Lourenço, 2025

Palaeobutheolus staxi Lourenço **sp**. **n**.

(Fig. 1-15)

ZooBank: https://zoobank.org/91F0D3DF-13F8-432E-9DFF-339BB2BA28F8

Holotype. Most certainly a pre-adult male.

Diagnosis for the new species. – The general morphology of the new species is similar to that of the first described species of *Palaeobutheolus*; however distinctive characters are clearly present (see relationships). In account of these marked distinct characters, the new species can be diagnosticated as follows: specimen rather bulk with moderately long pedipalps. Anterior margin of carapace straight to almost slightly convex. Two large median eyes and three pairs of lateral eyes. Sternum pentagonal. Tergites with one median carinae and two vestigial lateral carinae. Metasomal segments approximately rounded and with 10 carinae on segments I and II; 8 carinae on III and IV. Telson with a pear-like shape, without any sub-aculear tooth but with a pseudo annular ring, character uncommon among buthids, but already observed for the first species of the genus. Chela fingers with 8-9 rows of small granules, separated by slightly bigger central accessory granules. Trichobothrial pattern similar to that of extant buthid type A (Vachon 1974); the dorsal trichobothria of femur presenting a β disposition (Vachon, 1975). Femur certainly with a majorante neobothriotaxy with 4 internal, 5 dorsal and possibly 3 external. Patella most certainly with a minorante neobothriotaxy with 1 internal; presence of dorsal $\mathbf{d_1}$, $\mathbf{d_4}$ and $\mathbf{d_5}$ but absence of $\mathbf{d_2}$ and $\mathbf{d_3}$; all external trichobothria can be clearly observed for the first time totalising 7 trichobothria distributed in territories **et**, **est**, **em**, **esb** and **eb**; ventral trichobothria absent. Chela with 7 trichobothria on fixed finger, **dt**, **db**, **et**, **est**, **esb**, **eb** and **it** and 8 on chela hand, **Et**, **Est**, **Esb**, $\mathbf{Eb_1}$ to $\mathbf{Eb_3}$. On ventral aspect, $\mathbf{V_1}$ and $\mathbf{V_2}$ are present. Chelicera cannot be observed. Tibial spurs present on legs III and IV, moderate in size. Pedal spurs present in all legs.

Type locality and horizon. – Myanmar (Burma), most certainly Kachin; precise locality cannot be precisely defined; Lower Cretaceous.

Patronym. – The specific name honors Dr. Dietmar Stax (Pfungen, Switzerland) who continuosly supported several amber studies.

Depository. – The type specimen is deposited in the collections of Dr. Dietmar Stax (Pfungen, Switzerland).

Description

Coloration. – The scorpion is yellow to slightly reddish-yellow with some darker zones on carapace and tergites. Carapace and tergites yellow; metasomal segments yellow to reddish-yellow; telson pale reddish; pedipalps and legs yellow; venter and pectines yellow. Only the areas covered by a black substance or vegetal debris, such as the chelicera prevent a good observation.

Morphology. – Carapace not granular, almost smooth; anterior margin straigth to slightly convex. Carinae totally inconspicuous or absent; furrows inconspicuous. Median ocular tubercle largely anterior to the centre of the carapace; median eyes conspicuous and separated by approximately one ocular diameter; three pairs of small lateral eyes. Sternum pentagonal. Genital operculum with two semi-oval flattened plates. Mesosomal tergites weakly granular to smooth, with one median carina and two inconspicuous lateral carinae; VII with five carinae; the lateral weak and the internal inconspicous. Pectines large, with 18-18 teeth; fulcra present but inconspicuous. Sternites apparently smooth with small oval to slit-like spiracles. Metasomal segments I to II apparently with 10 carinae; III-IV with 8 carinae without spinoid granules on dorsal carinae; segment V with 5 carinae; all segments are more or less rounded, in particular V. Telson pear-like shaped with one strong ventral carina and marked lateral carinae; sub-aculear tooth absent but presence of a pseudo annular ring. Metasomal segments and telson with a marked setation. Chelicera not observable, but possibly of the buthid type (Vachon, 1963). Pedipalp femur pentacarinate; patella with 6-7 carinae weakly marked; both segments weakly granular; internal faces of femur and patella with minor spinoid granules; chela weakly elongated with vestigial carinae; chela fingers with 8-9 rows of small granules, separated by slightly bigger central accessory granules. Trichobothrial pattern very similar to the extant buthid type A (Vachon 1974). See diagnosis for details. Legs tarsi elongated with short spinoid setae forming more or less a brush. Tibial spurs present on legs III and IV, moderately marked; pedal spurs present on legs I-IV weak to moderate in size.

Comparative morphometric values (mm) for the male holotypes of *Palaeobutheolus andreschmidti* Lourenço, 2025 and *Palaeobutheolus staxi* Lourenço **sp**. **n**. (in this order).

– ***Total length*** 9.45/9.63.

– ***Carapace***
length 1.14/1.41;
anterior width 0.91/0.94;
posterior width 1.54/1.47.

– ***Mesosoma*** length 1.64/2.11.

– ***Metasomal segments***
I: length 0.74/0.67, width 0.74/0.66;
II: length 0.91/0.81, width 0.74/0.61;
III: length 1.04/0.94, width/depth 0.81/0.54;
IV: length 1.07/1.03, width/depth 0.82/0.54;
V: length 1.64/1.32, width/depth 0.83/0.47.

– ***Telson*** length 1.27/1.34, depth 0.44/0.41.

– ***Pedipalp***
femur length 1.09/1.02, width 0.35/0.34;
patella length 1.28/1.41, width 0.39/0.47;
chela length 2.07/2.14, width 0.34/0.34;
movable finger length 1.27/1.41.

Relationships. – Presently, only one species, *Palaeobutheolus andreschmidti* Lourenço, 2025 is known for the genus *Palaeobutheolus*. The new species can however be distinguished from *P. andreschmidti* by a number of features:

(**i**) anterior edge of the carapace not concave but slightly convex,

(**ii**) spiracles oval to slit-like,

(**iii**) telson not rounded, but rather pear-like shaped,

(**iv**) distinct morphometric values,

(**v**) marked differences in the number and position of trichobothria; trichobothria **db** of fixed finger located between **et** and **est** in *P. andreschmidti*, but clearly basal to to **est** in the new species; presence of a $\mathbf{V_2}$ in chela hand; possible absence of $\mathbf{d_2}$ and $\mathbf{d_3}$ on patella (see figures).

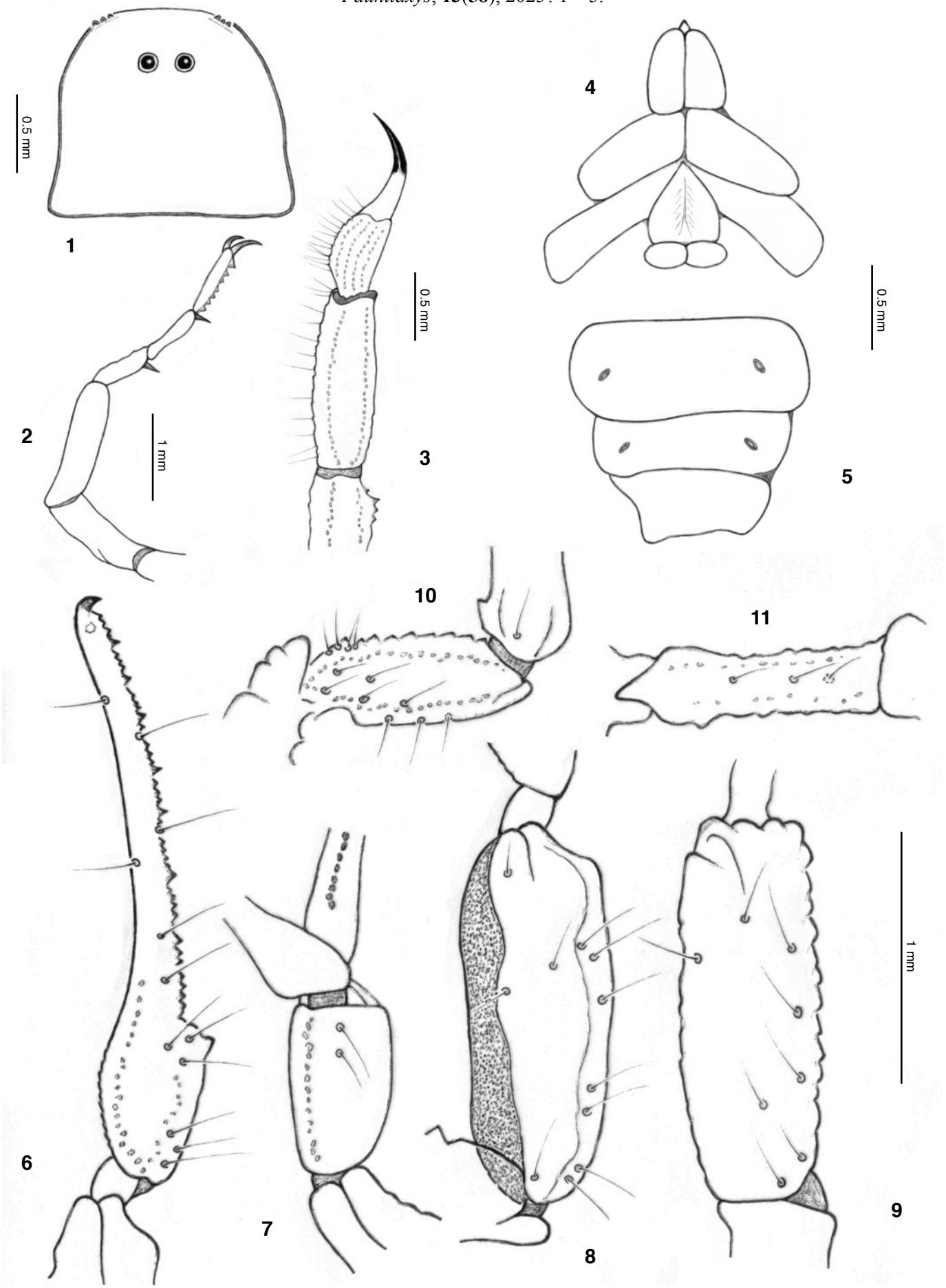

Fig. **1**-**11**. *Palaeobutheolus staxi* Lourenço **sp**. **n**. Male holotype.

1. Carapace, dorsal aspect. **2**. Leg IV, lateral aspect, showing spurs and spinoid setae on tarsi. **3**. Metasomal segments IV, V and telson, lateral aspect. **4**. Ventral aspect showing coxapophysis, sternum and genital operculum. **5**. Sternites V to VII showing spiracles. **6**-**11**. Trichobothrial pattern. **6**-**7**. Chela, dorso-external and ventral aspects. **8**-**9**. Patella dorso-external and external aspects. **10**-**11**. Femur dorsal and external aspects.

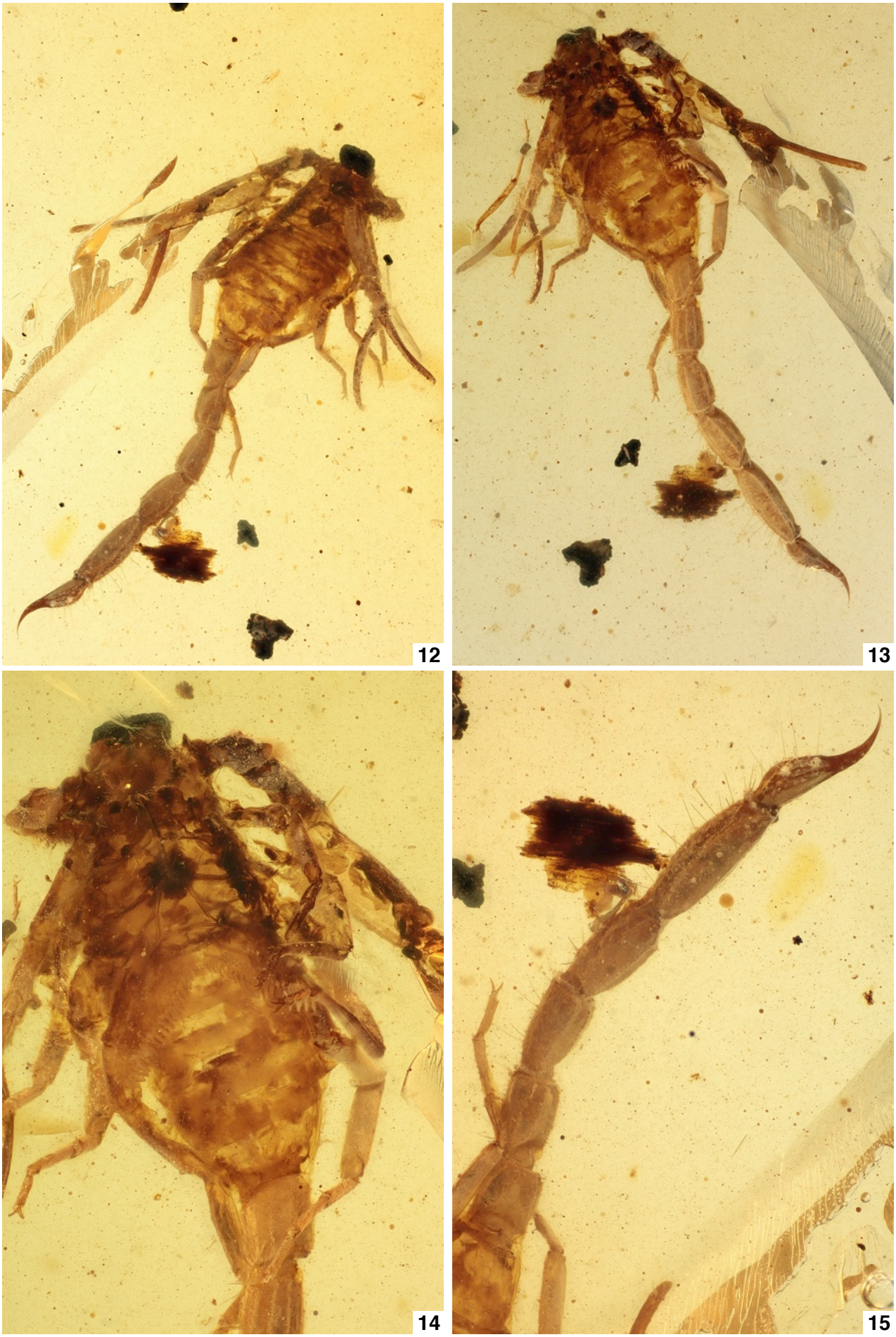

Fig. **12-15**. *Palaeobutheolus staxi* Lourenço **sp**. **n**. Male holotype.

12-13. Habitus, dorsal and ventral aspects. **14**. Ventral aspect in detail, showing, coxapophysis, sternum, genital operculum and pectines. **15**. Metasoma and telson, lateral aspect.

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Authors contribution [1]

Publisher Correspondence. – WL
Writing the article. – WL
Description. – WL
Article proofreading. – WL
Bibliographic work. – WL
Material study. – WL & JV
Author of the figures. – WL (Fig. 1-11)

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Résumé

Lourenço W. R. & Velten J., 2025. – Une deuxième espèce pour le remarquable genre *Palaeobutheolus* Lourenço, 2025 de l'ambre Crétacé de Birmanie et confirmation de son association à la famille actuelle des Buthidae (Scorpiones : Buthoidea). *Faunitaxys*, 13(58): 1 – 5.

L'étude d'un nouveau spécimen de scorpions de l'ambre du Crétacé inférieur du Myanmar conduit à la description d'une nouvelle espèce appartenant au remarquable genre *Palaeobutheolus* Lourenço, 2025, confirmant ainsi son association à la lignée des Buthoidea ainsi qu'à la famille actuelle des Buthidae C. L. Koch, 1837. La nouvelle espèce présente des caractères très distincts, notamment un telson plutôt en forme de poire, avec absence d'épine sous-aiguillonaire mais présence d'une pseudo constriction à la base de l'aiguillon, le bord antérieur de la carapace de forme presque convexe, des stigmates de forme ovale ou allongée, des valeurs morphométriques distinctes et des différences notables dans le nombre et la position des trichobothries. La découverte de cette nouvelle espèce confirme la validité du genre *Palaeobutheolus* et conforte une fois de plus l'existence d'éléments appartenant aux Buthidae au sein de la faune scorpionique de l'ambre Crétacé de Myanmar.

Mots-clés. – Scorpiones, *Palaeobutheolus*, *staxi*, fossile, nouvelle espèce, description, variabilité, Ambre Birman.

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SOMMAIRE

Une deuxième espèce pour le remarquable genre *Palaeobutheolus* Lourenço, 2025 de l'ambre Crétacé de Birmanie et confirmation de son association à la famille actuelle des Buthidae (Scorpiones : Buthoidea).

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A second species for the remarkable genus *Palaeobutheolus* Lourenço, 2025 from Burmese Cretaceous amber, and confirmation of its association to the extant family Buthidae (Scorpiones: Buthoidea).

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Illustration de la couverture :

Palaeobutheolus staxi Lourenço **sp**. **n**. in the stone ; ventral aspect.

Crédits:

Wilson R. **Lourenço** : Fig. 1-11.

Alexander Beigel : Fig. 12-15 & couverture.

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